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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte DIANE D. ILSLEY, DOUGLAS A. AMORESE,
MICHAEL P. CAREN, and PETER TSANG

Appeal 2009-000253
Application 09/919,643
Technology Center 1600

Decided: October 23, 2009

Before ERIC GRIMES, LORA M. GREEN, and
RICHARD M. LEBOVITZ, *Administrative Patent Judges.*

GREEN, *Administrative Patent Judge.*

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the Examiner's final rejection of claims 1, 2, 4-10, 12-28, and 35-39. We have jurisdiction under 35 U.S.C. § 6(b).

STATEMENT OF THE CASE

Claim 1 is representative of the claims on appeal, and reads as follows:

1. A method for depositing a quantity of a fluid containing a protein reagent of interest onto a surface of a substrate, said method comprising:

(a) front loading said quantity of fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein said front loading comprises contacting said orifice with said fluid in a manner so that said fluid flows through said orifice into said firing chamber, wherein said quantity of fluid is no more than about 5 μl;

(b) positioning said loaded thermal inkjet head in opposing relation to said surface; and

(c) actuating said thermal inkjet head to deposit said quantity of fluid onto said surface in a manner that maintains said reagent's functionality.

The Examiner relies on the following evidence:

Deeg	US 5,338,688	Aug. 16, 1994
Cowger	US 5,409,134	Apr. 25, 1995
Caren	US 6,221,653 B1	Apr. 24, 2001
Schleifer	US 6,242,266 B1	Jun. 5, 2001
Caren	US 6,323,043 B1	Nov. 27, 2001
Caren	US 6,656,740 B1	Dec. 2, 2003
Caren	US 6,797,469 B2	Sep. 28, 2004
Caren	US 6,884,580 B2	Apr. 25, 2005

The following grounds of rejection are before us for review:

I) Claims 1, 2, 4, 6-10, 12, 13, 15-18, 20, 21, and 35-38 stand rejected under 35 U.S.C. § 102(a/e) as being anticipated by Caren '653;

II) Claims 1, 2, 4, 6-10, 12, 13, 15-18, 20, 21, and 35-38 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Caren '469;

III) Claims 1, 2, 4-10, 12-28, and 35-39 stand rejected under 35 U.S.C. § 102(b) as anticipated by, or, in the alternative, under 35 U.S.C. § 103(a) as being obvious over Deeg;

IV) Claims 1, 2, and 9 stand rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 19-21 and 23 of U.S. Patent No. 6,797,469 B2;

V) Claims 1, 2, and 9 stand rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 3, 5-7, 9, 10, 12, 17, and 19 of U.S. Patent No. 6,221,653 B1;

VI) Claims 1, 2, and 9 stand rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 5, 9, 11-13, 15, and 18 of U.S. Patent No. 6,656,740 B1;

VII) Claims 1, 2, 6, and 7 stand rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-5, 7, and 11-19 of U.S. Patent No. 6,323,043 B1 and claims 1, 2, 4, and 6 of its related U.S. Patent No. 6,884,580 B2;

VIII) Claims 1, 2, and 4 stand rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 3, 8, 12, 14, 15, and 18 of U.S. Patent No. 6,242,266 B1.

We affirm rejections I, II, and IV-VIII, but reverse rejection III.

ISSUE (Caren '653 and Caren '469)

The Examiner finds that claims 1, 2, 4, 6-10, 12, 13, 15-18, 20, 21, and 35-38 are anticipated under 35 U.S.C. § 102(a/e) by Caren '653; and

that claims 1, 2, 4, 6-10, 12, 13, 15-18, 20, 21, and 35-38 are anticipated under 35 U.S.C. § 102(e) by Caren '469.

Appellants contend that claim 1 requires depositing a quantity of fluid containing a protein reagent of interest, such as an enzyme, in a manner that retains the deposited reagent's functionality, and that neither the '653 patent nor the '469 patent teaches, either expressly or inherently, the method of depositing a quantity of fluid containing a protein reagent, or protein reagent binding pair of interest, onto a surface of a substrate.

Thus, the issue on appeal is: Have Appellants demonstrated that the Examiner erred in finding that the '653 patent and the '469 patent teach a method of depositing a quantity of fluid containing a protein reagent, or protein reagent binding pair of interest, onto a surface of a substrate, as required by claim 1?

FINDINGS OF FACT

FF1 The invention is drawn to "[m]ethods for efficiently depositing small quantities of fluids containing a protein(s) onto the surface of a substrate." (Spec. ¶6.)

FF2 In the method, "a small volume of fluid containing the protein(s) of interest is front loaded into a thermal inkjet device . . . . [and] a small quantity of the front loaded fluid is expelled onto the surface of a substrate." (*Id.*)

FF3 The Specification defines "protein" as "polypeptides of specific sequence of more than about 50 residues." (*Id.* at ¶9.)

FF4 The Specification notes further that "proteins of interest" may be "binding molecules such as antigens, antibodies, ligands, etc., enzymes, and the like." (*Id.* at ¶14.)

FF5 Specifically, the Specification teaches:

> The subject arrays produced in accordance with the invention find use in a variety [of] microarray applications, including analyte detection applications in which the presence of a particular analyte in a given sample may be detected. Protocols for carrying out such assays are well known to those of skill in the art and need not be described in detail herein. Briefly, a sample comprising the analyte of interest is contacted with an array produced according to the subject methods under conditions sufficient for the analyte to bind to its respective binding pair member that is present on the array. Thus, if the analyte of interest is present in the sample, it binds to the array at the site of its complementary binding member and a complex is formed on the array surface. The presence of this binding complex on the array surface is then detected, e.g. through use of a signal production system, e.g. an isotopic or fluorescent label present on the analyte, etc. The presence of the analyte in the sample is then deduced from the detection of binding complexes on the substrate surface.

(*Id.* at ¶39.)

FF6 The Examiner rejects claims 1, 2, 4, 6-10, 12, 13, 15-18, 20, 21, and 35-38 under 35 U.S.C. § 102(a/e) as being anticipated by Caren '653 (Ans. 4). Appellants state that the claims are treated as a group (App. Br. 7); we thus focus our analysis on claim 1, and claims 2, 4, 6-10, 12, 13, 15-18, 20, 21, and 35-38 stand or fall with that claim.

FF7 The Examiner finds that Caren '653 teaches all of the steps of the method of claim 1 (Ans. 4).

FF8 Specifically, the Examiner finds that Caren '653 teaches "a method for depositing a quantity of fluid containing a plurality of binding agents onto a substrate surface (such as an array) . . . which reads on the method of depositing fluid on a substrate." (*Id.*)

FF9 The Examiner finds further that the '653 patent teaches that "the deposit[ed] fluid comprises 'biomolecules' including 'polypeptides' . . . which reads on the protein reagent." (*Id.*)

FF10 The Examiner notes further that giving the phrase "a quantity of a fluid containing a protein reagent of interest" its broadest reasonable interpretation, requires only that the fluid contain a protein (*id.* at 15).

FF11 The '653 patent is drawn to "[m]ethods for depositing small quantities of a fluid sample onto the surface of an array." ('653 patent, col. 1, ll. 52-53.)

FF12 The '653 patent teaches that the fluid sample may be applied to a structure, such as an array, that has a binding agent stably associated with its surface, wherein the binding agent may be a biological molecule, such as a polypeptide (*i.e.*, a protein) (*id.* at col. 3, ll. 9-29).

FF13 The fluid sample that is deposited is a sample suspected of containing an analyte of interest, which may be a biological molecule, such as a polypeptide (*i.e.*, a protein) (*id.* at col. 4, ll. 10-26).

FF14 The '653 patent teaches the use of a thermal inkjet printer to deposit the fluid. Specifically, the patent teaches:

> In practicing the subject methods, the thermal inkjet device is loaded with a fluid sample, e.g. a nucleic acid fluid sample. The fluid may be loaded into the firing chamber and fluid reservoir using any convenient means. Thus, conventional methods of introducing ink into thermal inkjet heads may be

> employed. Where such methods are employed, following loading of the fluid sample into the inkjet head, it is often desirable to "prime" the device prior to use. One means of priming the device is to apply sufficient pressure to the fluid in the reservoir (or conversely negative pressure to the orifice) such that a volume of fluid is forced out of the orifice. Such priming methods are currently employed in the printing industry and thus are well known to those of skill in the art.
>
> Alternatively, where minimal waste of the fluid sample [is] desired, e.g. where the fluid is an expensive or rare cDNA sample, the following method of loading the fluid sample into the firing chamber and reservoir may be employed. In this method of fluid sample loading, the orifice is contacted with the fluid under conditions sufficient for fluid to flow through the orifice and into the firing chamber of the head, where fluid flow is due, at least in part, to capillary forces. To assist in the flow of fluid into the orifice, back pressure in the form of suction (i.e. negative pressure) may be applied to the firing chamber (and reservoir, if present) of the head, where the back pressure will typically be at least about 5, and may be at least about 10 and even as great as about 100 inches of H_2O or more.

(*Id.* at col. 5, ll. 35-62.)

FF15 The Examiner rejects claims 1, 2, 4, 6-10, 12, 13, 15-18, 20, 21, and 35-38 under 35 U.S.C. § 102(e) as being anticipated by Caren '469 (Ans. 5). Appellants state that the claims are treated as a group (App. Br. 13); we thus focus our analysis on claim 1, and claims 2, 4, 6-10, 12, 13, 15-18, 20, 21, and 35-38 stand or fall with that claim.

FF16 The Examiner finds that Caren '469 teaches all of the steps of the method of claim 1; specifically, a method of depositing a fluid containing a polypeptide, *i.e.*, a protein, onto an array surface (Ans. 5).

FF17 The '469 patent is a continuation of the '653 patent ('469 patent, front page) and therefore contains the same teachings as the '653 patent.

PRINCIPLES OF LAW

In order for a prior art reference to serve as an anticipatory reference, it must disclose every limitation of the claimed invention, either explicitly or inherently. *In re Schreiber*, 128 F.3d 1473, 1477 (Fed. Cir. 1997).

Our mandate is to give claims their broadest reasonable interpretation. *In re American Academy Of Science Tech Center*, 367 F.3d 1359, 1364 (Fed. Cir. 2004). "An essential purpose of patent examination is to fashion claims that are precise, clear, correct, and unambiguous. Only in this way can uncertainties of claim scope be removed, as much as possible, during the administrative process." *In re Zletz*, 893 F.2d 319, 322 (Fed. Cir. 1989).

As to the preamble of the claim, "[i]f the claim preamble, when read in the context of the entire claim, recites limitations of the claim, or, if the preamble is 'necessary to give life, meaning, and vitality' to the claim, then the claim preamble should be construed as if in the balance of the claim. . . . If, however, the body of the claim fully and intrinsically sets forth the complete invention, including all of its limitations, and the preamble offers no distinct definition of any of the claimed invention's limitations, but rather merely states, for example, the purpose or intended use of the invention, then the preamble is of no significance to claim construction because it cannot be said to constitute or explain a claim limitation." *Pitney Bowes, Inc. v. Hewlett Packard Co.*, 182 F.3d 1298, 1305 (Fed. Cir. 1999).

ANALYSIS

Appellants argue that claim 1 requires "depositing a quantity of fluid containing a protein reagent of interest (e.g. an enzyme) in a manner that

retains the deposited reagent's functionality" (App. Br. 8), and that the '653 patent "fails to teach, either expressly or inherently, the method of depositing a quantity of fluid containing a protein reagent, or protein reagent binding pair of interest onto a surface of a substrate, as is claimed" (*id.* at 9).

The fluids deposited by Caren '653, Appellants assert, are suspected of containing an analyte of interest, and are "not a protein reagent as claimed." (*Id.*) Appellants assert that the term "reagent" requires a substance used to detect the presence of an analyte, and is not the analyte itself (*id.*).

In response to the Examiner's assertion that the "fluid" of Caren '653 contains a binding agent, Appellants assert that a "binding agent" is a member of a specific binding pair, which is not the same as a reagent (*id.* at 10). According to Appellants, "Caren '653 is directed to deposition of sample, not reagent, on an array." (*Id.*) Appellants argue that "an array produced in accordance with the invention is used to 'measure' or 'examine' a sample for the presence of an analyte." (Reply Br. 3.) Thus, Appellants assert, "because Caren '653 does not teach the method of depositing a quantity of fluid containing a protein reagent, or protein reagent binding pair of interest onto a surface of a substrate, Caren '653 does not anticipate the rejected claims." (App. Br. 13.)

Claim 1 is drawn to a method of "depositing a quantity of a fluid containing a protein reagent of interest onto a surface of a substrate," requiring the steps of: 1) "front loading said quantity of fluid into a thermal inkjet head comprising an orifice and a firing chamber, wherein said front loading comprises contacting said orifice with said fluid in a manner so that

said fluid flows through said orifice into said firing chamber, wherein said quantity of fluid is no more than about 5 μl;" 2) "positioning said loaded thermal inkjet head in opposing relation to said surface;" and 3) "actuating said thermal inkjet head to deposit said quantity of fluid onto said surface in a manner that maintains said reagent's functionality." Appellants do not argue that Caren '653 does not teach the steps of the claimed method, but assert that Caren '653 teaches deposition of a "protein analyte," not a "protein reagent." Appellants' argument has been considered, but is not convincing.

First, while the claims use the phrase "a protein reagent of interest" we find the recitation that the protein serves as a "reagent" is merely a statement of intended use, and not a patentable limitation, as the claims recite any step of actually using the protein as a reagent.

Second, we also conclude that Appellants are arguing semantics. All that is require by the method is the deposition of a fluid containing a protein onto the surface of a substrate. Whether that protein in a subsequent, non-claimed method, is used as a "reagent" or an "analyte" is irrelevant to the claimed method. The protein is still a protein, which is all that is required to be deposited onto the substrate using the steps recited by the instantly claimed method.

As to the anticipation rejection over Caren '469, Appellants essentially reiterate the arguments made with respect to Caren '653 (App. Br. 13-17). Those arguments are not found to be convincing for the reasons set forth with respect to the Caren '653 patent.

CONCLUSION(S) OF LAW

We find that Appellants have not demonstrated that the Examiner erred in finding that the '653 patent and the '469 patent teach a method of depositing a quantity of fluid containing a protein reagent, or protein reagent binding pair of interest onto a surface of a substrate, as required by claim 1.

We thus affirm the rejection of claims 1, 2, 4, 6-10, 12, 13, 15-18, 20, 21, and 35-38 under 35 U.S.C. § 102(a/e) as being anticipated by Caren '653; as well as the rejection of claims 1, 2, 4, 6-10, 12, 13, 15-18, 20, 21, and 35-38 under 35 U.S.C. § 102(e) as being anticipated by Caren '469.

ISSUE (Deeg)

The Examiner concludes that claims 1, 2, 4-10, 12-28, and 35-39 are anticipated by, or, in the alternative, rendered obvious by, Deeg.

Appellants assert that Deeg fails to teach, expressly or inherently, front loading a fluid into an inkjet head by contacting an orifice with the fluid in a manner so that the fluid flows through the orifice and into a firing chamber, as is claimed.

Thus, the issue on appeal is: Have Appellants demonstrated that the Examiner erred in finding that Deeg inherently teaches front loading a fluid into an inkjet head by contacting an orifice with the fluid in a manner so that the fluid flows through the orifice and into a firing chamber, as is claimed?

FINDINGS OF FACT

FF18 The Specification teaches that "[i]n practicing the subject methods, a small volume of fluid containing the protein(s) of interest is front loaded into a thermal inkjet device." (Spec. 2.)

FF19 Specifically, the Specification teaches:

> In practicing the subject methods, the thermal inkjet device is front loaded with a fluid sample containing the one or more proteins of interest. Because the methods are methods of efficiently depositing a volume or quantity of fluid onto a surface, such that the amount of fluid required is small and most efficiently and effectively utilized, a front loading procedure is typically employed for loading the fluid into the head. In this front loading protocol, the orifice is contacted with the fluid under conditions sufficient for fluid to flow through the orifice and into the firing chamber of the head, where fluid flow is due, at least in part, to capillary forces. To assist in the flow of fluid into the orifice, back pressure in the form of suction (i.e. negative pressure) may be applied to the firing chamber (and reservoir, if present) of the head, where the back pressure will typically be at least about 5, and may be at least about 10 even as great as about 100 inches of H_2O or more.
>
> The amount of fluid required to load the head is typically small, generally not exceeding more than about 10 µl, usually not exceeding more than about 5 µl and in many embodiments not exceeding more than about 2 µl. As such, the amount of fluid that is wasted in readying or preparing the thermal inkjet head for firing is minimal. As such, fluid loading is highly efficient. Therefore, the subject methods are particularly suited for use with rare and/or expensive fluid samples.

(*Id.* at 6.)

FF20 The Examiner rejects claims 1, 2, 4-10, 12-28, and 35-39 under 35 U.S.C. § 102(b) as anticipated by, or, in the alternative, under 35 U.S.C. § 103(a) as being obvious over Deeg (Ans. 6).

FF21 The Examiner finds that Deeg teaches a method of applying a biochemical analytical liquid to a target (*id.*).

FF22 The Examiner finds that Deeg teaches ejecting a biochemical analytical liquid from a jet chamber and an inkjet printing head with an ink reservoir (which the Examiner finds reads on the claimed firing chamber), and that "[s]ince [the] thermal inkjet would utilize pressure to eject fluid onto [a] substrate and aspirat[e the] . . . reagent solution (e.g. See Example 4, step e)[ ], these read . . . . on a thermal inkjet head comprising an orifice (See Figure 1 of the reference, for example) and a firing chamber." (*Id.* at 7.)

FF23 Specifically, the Examiner finds that "[a]lthough [Deeg] does not explicitly teach the step of 'front loading said quantity of fluid into a thermal inkjet head . . .', the claimed thermal inkjet head inherently performs 'front loading' process." (*Id.* at 8.)

FF24 According to the Examiner, both Deeg and the instant Specification use the same device, that is a thermal inkjet head printing device (*id.*), "[t]hus, it can be logically concluded that the 'thermal inkjet head' of the prior art as described in the instant specification or the inkjet head of [Deeg], 'in its normal and usual operation, would necessarily perform the method claimed.'" (*Id.* at 9.)

FF25 Deeg teaches "a method or a device for the application of microquantities of biochemical analytical liquids which is less expensive

than the previously known methods in terms of construction and which makes it possible very accurately to meter very small quantities (less than 1 µl) at a high frequency (more than 1000 Hz)." (Deeg, col. 2, ll. 3-9.)

FF26 Figure 1 of Deeg is reproduced below.

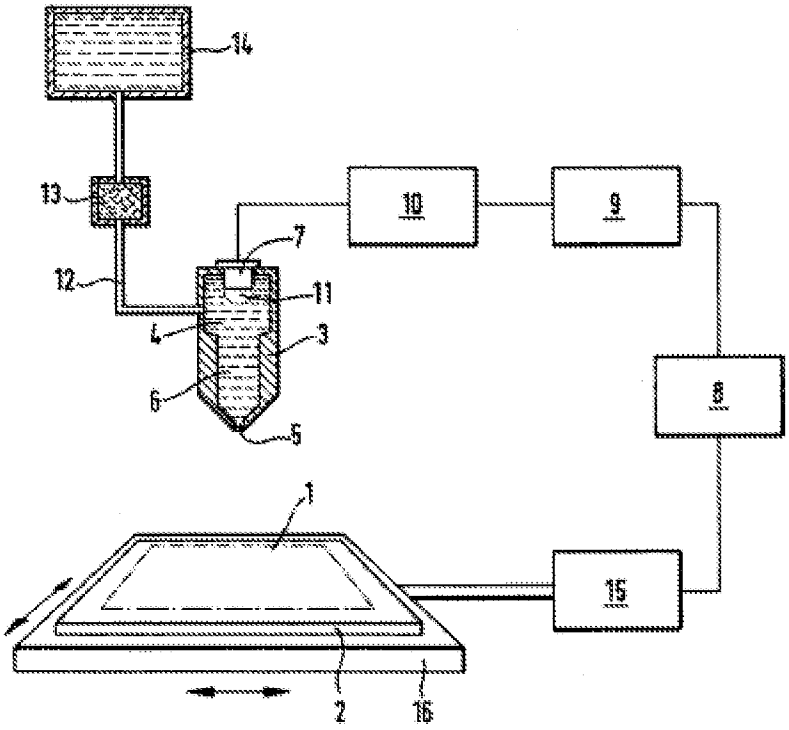

Fig. 1

Figure 1 shows "a basic diagram—partly in the form of a block diagram—of a device for the preparation of analysis elements." (*Id.* at col. 3, ll. 14-16.)

FF27 The Figure shows a jet head 3 with a heating element 7 and a jet 5 (*id.* at col. 3, ll. 52-53). Deeg teaches that the "jet chamber 4 is connected, via a line 12 with filter 13, to a reservoir 14 for analytical liquid 6," wherein the "jet head 3, filter 13 and reservoir 14 can be accommodated in a disposable cartridge (jet unit)." (*Id.* at col. 3, ll. 39-43.)

PRINCIPLES OF LAW

The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) the level of ordinary skill in the art; (3) the differences between the claimed invention and the prior art; and (4) secondary considerations of nonobviousness, if any. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966).

A rejection for obviousness must include "articulated reasoning with some rational underpinning to support the legal conclusion." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007), quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). While the analysis under 35 U.S.C. § 103 allows flexibility in determining whether a claimed invention would have been obvious, *KSR*, 550 U.S. at 418, "[w]e must still be careful not to allow hindsight reconstruction of references to reach the claimed invention without any explanation as to how or why the references would be combined to produce the claimed invention." *Innogenetics, N.V. v. Abbott Labs.*, 512 F.3d 1363, 1374 n.3 (Fed. Cir. 2008).

ANALYSIS

Appellants argue that "Deeg fails to teach, expressly or inherently, front loading a fluid into an inkjet head by contacting an orifice with the fluid in a manner so that the fluid flows through the orifice and into a firing chamber, as is claimed." (App. Br. 20.)

Appellants argue that the Examiner is incorrect in finding that the inkjet head of Deeg inherently performs a front-loading process, "because the 'normal and usual operation' of Deeg is to load analytical liquid into

'disposable jet units' (i.e., cartridges) 'which contain the analytical liquid (especially reagents or calibrating liquids) in prepacked form' which are then associated with the inkjet head." (*Id.* (quoting Deeg, col. 2, ll. 22-25).)

Thus, according to Appellants, the "methods disclosed by Deeg describe a traditional use of inkjet heads, where the fluid comes from a reservoir into the firing chamber, and therefore fluid does not go from the orifice into the firing chamber." (App. Br. 21.) Appellants assert further that "nowhere does Deeg teach front loading a fluid into an inkjet head by contacting an orifice with the fluid in a manner so that the fluid flows through the orifice and into a firing chamber." (*Id.*)

As to the obviousness part of the rejection, Appellants again assert that "Deeg fails to teach or suggest front loading a fluid into an inkjet head by contacting an orifice with the fluid in a manner so that the fluid flows through the orifice and into a firing chamber." (*Id.* at 24.)

We agree with Appellants that Deeg discloses a traditional use of inkjet heads, and the Examiner has not set forth any evidence or scientific reasoning as to why it would have been obvious to the ordinary artisan to have modified the method of Deeg, in which the cartridges contain the analytical liquid, that is the fluid containing the protein, to a front loading method as claimed.

The Examiner finds that Deeg inherently discloses a front loading method because it uses the same equipment, that is an ink-jet printer, as that required by claim 1. The record, however, does contain evidence that the conventional method is not the same as the front loading method. Specifically, Caren '653 teaches that the fluid may be loaded into the firing

chamber and fluid reservoir using any conventional means, or, where minimal waste of the fluid sample desired, the orifice is contacted with the fluid under conditions sufficient for fluid to flow through the orifice and into the firing chamber of the head, where fluid flow is due, at least in part, to capillary forces (*see, e.g.*, FF14). Thus, the Examiner has not established, based on the evidence of record, that Deeg inherently discloses a front loading method as required by claim 1.

CONCLUSIONS OF LAW

We conclude that Appellants have demonstrated that the Examiner erred in finding that Deeg inherently teaches front loading a fluid into an inkjet head by contacting an orifice with the fluid in a manner so that the fluid flows through the orifice and into a firing chamber, as is claimed.

We thus reverse the rejection of claims 1, 2, 4-10, 12-28, and 35-39 under 35 U.S.C. § 102(b) as anticipated by, or, in the alternative, under 35 U.S.C. § 103(a) as being obvious over Deeg.

ISSUE (Double-patenting)

The issue on appeal is: Have Appellants demonstrated the Examiner erred in concluding that a number of the claims are rendered obvious by a number of claims in different issued patents?

FINDINGS OF FACT

FF28 The Examiner rejects claims 1, 2, and 9[1] on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 19-21 and 23 of U.S. Patent No. 6,797,469 B2 (Ans. 11). Appellants state that the claims are treated as a group (App. Br. 36), we thus focus our analysis on claim 1, and claims 2 and 9 stand or fall with that claim.

FF29 The Examiner finds that the "'469 patent claims a method for depositing a quantity of fluid containing a . . . polypeptide . . . onto an array surface." (Ans. 11.)

FF30 Claim 19 of the '469 patent is reproduced below:

> 19. A method for depositing a quantity of fluid containing a nucleic acid or polypeptide onto an array surface having a plurality of nucleic acids or polypeptides stably associated therewith, said method comprising:
>
> loading said fluid containing nucleic acid or polypeptide into a thermal inkjet head comprising an orifice and a firing chamber by contacting said orifice with said fluid in a manner sufficient for said fluid to flow through said orifice into said firing chamber;
>
> positioning said thermal inkjet head filled with said nucleic acid or polypeptide containing fluid in opposing relation to said substrate; and
>
> actuating said thermal inkjet head in a manner sufficient to expel a quantity of said fluid onto said substrate surface to deposit said quantity of fluid on said substrate surface.

FF31 The Examiner rejects claims 1, 2, and 9 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 3, 5-

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[1] The Examiner also rejects claim 11, but claim 11 has been cancelled (App. Br. 3).

7, 9, 10, 12, 17, and 19 of U.S. Patent No. 6,221,653 B1 (Ans. 11). Appellants state that the claims are treated as a group (App. Br. 39); we thus focus our analysis on claim 1, and claims 2 and 9 stand or fall with that claim.

FF32 The Examiner finds that the '653 patent claims a method of "depositing a quantity of fluid containing a plurality of binding agents onto a substrate surface," wherein the binding agent may be a biomolecule, which would encompass a protein (Ans. 11).

FF33 Claims 1 and 3 of the '653 patent are reproduced below:

> 1. A method for depositing a quantity of fluid on a substrate surface having a plurality of binding agents stably associated therewith, said method comprising:
>
> loading said fluid into a thermal inkjet head comprising an orifice and a firing chamber by contacting said orifice with said fluid in a manner sufficient for said fluid composition to flow through said orifice into said firing chamber;
>
> positioning said thermal inkjet head filled with said fluid in opposing relation to said substrate surface; and
>
> actuating said thermal inkjet head in a manner sufficient to expel said quantity of fluid back through said orifice onto said substrate surface;
>
> whereby said quantity of fluid is deposited on said substrate surface.
>
> 3. The method according to claim 1, wherein said fluid comprises a biomolecule.

FF34 The Examiner rejects claims 1, 2, and 9[2] on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 5, 9, 11-13, 15, and 18 of U.S. Patent No. 6,656,740 B1 (Ans. 12). Appellants state that the claims are treated as a group (App. Br. 41); we thus focus our analysis on claim 1, and claims 2 and 9 stand or fall with that claim.

FF35 The Examiner finds that the '740 patent claims "a method for fabricating an array of biopolymers on a substrate using a biopolymer fluid." (Ans. 12.)

FF36 Claim 1 of the '740 patent is reproduced below:

> 1. A method of fabricating an array of biopolymers on a substrate using a biopolymer or biomonomer fluid and a drop dispenser having a chamber into which the fluid is loaded and an orifice communicating therewith from which the fluid is dispensed, the method comprising:
>
> (a) when the chamber is loaded, applying a prime pressure to the fluid which varies over a range sufficient to move fluid within the drop dispenser but insufficient to cause fluid to be dispensed from the orifice; and
>
> (b) dispensing drops from the dispenser to the substrate so as to form the array.

FF37 The Examiner rejects claims 1, 2, 6, and 7 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-5, 7, and 11-19 of U.S. Patent No. 6,323,043 B1 and claims 1, 2, 4, and 6 of its related U.S. Patent No. 6,884,580 B2 (Ans. 12). Appellants state that the claims 1, 2, 6, and 7 are treated as a group (App. Br. 42-43); we thus

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[2] The Examiner also rejects claim 11, but claim 11 has been cancelled (App. Br. 3).

focus our analysis on claim 1, and claims 2, 6, and 7 stand or fall with that claim.

FF38 The Examiner finds that the '043 patent claims "a method for fabricating an array of biopolymers on a substrate using a biopolymer fluid." (Ans. 12.)

FF39 Claim 1 of the '043 patent is reproduced below:

> 1. A method of fabricating an array of biopolymers on a substrate using a biopolymer or biomonomer fluid, and using a dispensing head having:
>
> a reservoir chamber;
>
> at least one jet which can dispense droplets onto a substrate, the jet including a capillary delivery chamber communicating with the reservoir chamber, and which capillary delivery chamber has an orifice and an ejector which, when activated, causes a droplet to be ejected from the orifice;
>
> the method comprising:
>
> (a) loading the head by positioning the head with the orifice adjacent and facing a biomonomer or biopolymer containing fluid, and providing a load pressure to the reservoir chamber which is sufficient such that the fluid is drawn into the reservoir chamber through the orifice and delivery chamber, while simultaneously being insufficient to result in ambient atmosphere entering the delivery chamber through the orifice once the head has been loaded and no further fluid is facing and adjacent the orifice;
>
> (b) positioning the head with the orifice facing the substrate; and
>
> (c) dispensing multiple droplets from the head so as to form an array of droplets on the substrate.

FF40 Claim 1 of the '580 patent is reproduced below:

> 1. A method of fabricating an array of biopolymers on a substrate using a dispensing head with biopolymer or biomonomer fluids, the fluid dispensing head having:

a reservoir chamber;

multiple jets which can dispense droplets onto a substrate, each jet including a delivery chamber communicating with the reservoir chamber, and including an orifice and an ejector which, when activated, causes a droplet to be ejected from the orifice;

the method comprising:

(a) loading the head through orifices of the jets with biopolymer or biomonomer fluids;

(b) positioning the head with the orifices facing the substrate;

(c) dispensing multiple droplets from the head orifices so as to form an array of droplets on the substrate;

(d) positioning the head with the orifices facing a cleaning station which is spaced from the substrate;

(e) exposing the head about the orifices to a cleaning fluid from the cleaning station; and

(f) repeating (a) to (f) as needed so as to form the array.

FF41 The Examiner rejects claims 1, 2, and 4[3] on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 3, 8, 12, 14, 15, and 18 of U.S. Patent No. 6,242,266 B1 (Ans. 13). Appellants state that the claims are treated as a group (App. Br. 45); we thus focus our analysis on claim 1, and claims 2 and 4 stand or fall with that claim.

FF42 The Examiner finds that the '266 patent claims "a method for fabricating an array of biopolymers on a substrate using a biopolymer fluid." (Ans. 13.)

FF43 Claim 1 of the '266 patent is reproduced below:

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[3] The Examiner also rejects claim 3, but claim 3 has been cancelled (App. Br. 3).

> 1. A method of fabricating an array of biopolymers on a substrate using a biopolymer or biomonomer fluid, and using a fluid dispensing head having:
>
> at least one jet which can dispense droplets onto a substrate, the jet including a chamber with an orifice, and including an ejector which, when activated, causes a droplet to be ejected from the orifice;
>
> the method comprising:
>
> (a) positioning the head with the orifice facing the substrate;
>
> (b) dispensing multiple droplets of the biopolymer or biomonomer fluid from the head so as to form an array of droplets on the substrate;
>
> (c) directing a gas flow through a venturi which has a throat opening communicating with the dispensing head chamber;
>
> (d) varying gas flow resistance on an outlet side of the venturi, to alter the chamber pressure.

PRINCIPLES OF LAW

The key question in any obviousness double patenting analysis is: "Does any claim in the application define merely an obvious variation of an invention claimed in the patent asserted as supporting double patenting?" *General Foods Corp. v. Studiengesellschaft Kohle mbH,* 972 F.2d 1272, 1278 (Fed. Cir. 1992) (discussing *In re Vogel,* 422 F.2d 438 (CCPA 1970)). As stated by our reviewing court in *In re Braat,* 937 F.2d 589, 592 (Fed. Cir. 1991):

> Obviousness-type double patenting is a judicially created doctrine intended to prevent *improper* timewise extension of the patent right by prohibiting the issuance of claims in a second patent which are not "patentably distinct" from the claims of a first patent.

ANALYSIS

As to the rejection over the '469 patent, Appellants assert that "'469 fails to teach, either expressly or inherently, the method of depositing a quantity of fluid containing a protein reagent, as is claimed." (App. Br. 37.)

As to the rejection over the '653 patent, Appellants essentially reiterate the arguments made with respect to the '469 patent (*id.* at 39-41), *i.e.*, that the '653 patent teaches deposition of a sample that may contain an analyte of interest, and does not disclose the deposition of a reagent.

Appellants' argument has been considered, but is not found to be convincing for the reasons set forth in regard to the rejection of claims 1, 2, 4, 6-10, 12, 13, 15-18, 20, 21, and 35-38 under 35 U.S.C. § 102(a/e) as being anticipated by Caren '653.

As to the rejection over the '740 patent, Appellants argue that the claims in that patent are directed to a method of fabricating an array of biopolymers by in-situ synthesis, which is in contrast to the current claims, which are drawn to depositing a protein reagent in a manner such that the protein's functionality is preserved (App. Br. 42).

Appellants' arguments have been considered, but are not convincing. The '740 patent claims "[a] method of fabricating an array of biopolymers on a substrate using a biopolymer or biomonomer fluid," and thus encompasses both a method of fabricating an array of biopolymers by in-situ synthesis, as well as a method of depositing a protein reagent in a manner such that the protein's functionality is preserved.

As to the rejections over the '043, '580, and '266 patents, Appellants reiterate the arguments made with respect to the '740 patent (App. Br. 42-47).

Again, Appellants' arguments have been considered, but are not convincing. As with the '740 patent, the claims of the '043, '580 and '266 patents also encompass both a method of fabricating an array of biopolymers by in-situ synthesis, as well as a method of depositing a protein reagent in a manner such that the protein's functionality is preserved.

CONCLUSIONS OF LAW

We conclude that Appellants have not demonstrated the Examiner erred in concluding that a number of the claims are rendered obvious by a number of claims in different issued patents.

We thus affirm the rejections of:

Claims 1, 2, and 9 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 19-21 and 23 of U.S. Patent No. 6,797,469 B2;

Claims 1, 2, and 9 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 3, 5-7, 9, 10, 12, 17, and 19 of U.S. Patent No. 6,221,653 B1;

Claims 1, 2, and 9 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 5, 9, 11-13, 15, and 18 of U.S. Patent No. 6,656,740 B1;

Claims 1, 2, 6, and 7 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-5, 7, and 11-19 of U.S.

Patent No. 6,323,043 B1 and claims 1, 2, 4, and 6 of its related U.S. Patent No. 6,884,580 B2; and

Claims 1, 2, and 4 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 3, 8, 12, 14, 15, and 18 of U.S. Patent No. 6,242,266 B1.

TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv)(2006).

AFFIRMED-IN-PART

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